

REMARKS

Claims 1-28 are pending in the present application and are rejected. Claims 1-28 are herein amended.

Applicants' Response to Objections to the Abstract

The Office Action objects to the abstract of the disclosure because it should be written in narrative form. Further, the Office Action notes that it exceeds the word limit for an abstract. In response, Applicants herein amend the abstract in order to overcome the objections.

Applicants' Response to Claim Rejections under 35 U.S.C. §102

Claims 1-3, 6, 27 and 28 were rejected under 35 U.S.C. §102(b) as being anticipated by Ishihara (JP 10-318733).

It is the position of the Office Action that Ishihara discloses the invention as claimed. Ishihara is directed at optical equipment in which light travels from a light source 1 to a sample *A* via a pinhole 2, collimate lens 4, beam splitter 5, microlens array 6, pinhole array section 7, liquid crystal cell 20 and objective lens 8. It is noted that the objective lens 8 contains a quarter phase contrast plate. Light then travels from sample *A* to photosensor 15 via objective lens 8, liquid crystal cell 20, pinhole array section 7, microlens array 6, beam splitter 5 and formation lens 12. The liquid crystal cell 20 is illustrated in detail in drawings 2(a), 2(b), 3 and 4.

Applicants respectfully submit that Ishihara does not disclose or suggest the invention of present claims 1 and 3. The liquid crystal cell used in Ishihara is such that transparent electrode

patterns and pinholes are alternately aligned. See paragraph [0016] and Figure 2. The liquid crystal cell of Ishihara is different from the matrix type liquid crystal device of the present invention, at least in that the liquid crystal device of the present invention controls *all* pixels. Further, in the two-dimensional arrangement type confocal optical imaging system disclosed in Figure 1 of Ishihara, the illuminating light transmitted through a liquid crystal cell 20 passes $\frac{1}{4}$ phase difference plate 10, and becomes circular polarized light to illuminate sample A.

Therefore, in Ishihara, using a matrix type liquid crystal device on the illuminating light side as required by present claims 1, 3, 7 and 12 is not disclosed or suggested. Also in Ishihara, it is not disclosed or suggested that a plurality of foci are made with mutually orthogonal polarization directions on the object to be observed. Finally, Ishihara does not disclose or suggest controlling the polarization directions of the light which is transmitted through each neighboring pixel of said matrix type liquid crystal device to be mutually orthogonal.

Since the present invention uses a matrix type liquid crystal device, if the pixel size is made, for example, $18\text{ }\mu\text{m} \times 18\text{ }\mu\text{m}$, then the pinhole density of 3086 per mm^2 and the pinhole size of about $4\text{ }\mu\text{m}$ or less can be realized. That is, according to the present invention, since a matrix type liquid crystal device is used, high integration can be easily realized.

Next, Applicants address claim 3. Claim 3 recites a first and second microlens array, as well as a first and second liquid crystal device. It is the position of the Office Action that Ishihara discloses these features, when it is stated that “[t]he liquid crystal device (20) would serve as a second liquid crystal device when the light travels back from the sample and back

Amendment
Serial No. 10/529,395
Attorney Docket No. 052310

through the liquid crystal device on the way to the detector.” The Office Action provides no comments with regard to a second microlens array.

In response, Applicants respectfully submit that the Office Action’s interpretation of Ishihara is improper. According to MPEP §2111, quoting *In re Morris*, “[the] PTO applies to verbiage of the proposed claims the broadest reasonable meaning of the words in their ordinary usage as they would be understood by one of ordinary skill in the art, *taking into account whatever enlightenment by way of definitions or otherwise that may be afforded by the written description contained in applicant's specification.*” (emphasis added). That section of the MPEP further states, quoting *In re Cortright*, “[t]he broadest reasonable interpretation of the claims must also be consistent with the interpretation that those skilled in the art would reach.”

Applicants respectfully submit that Ishihara does not disclose a second microlens array or a second liquid crystal device. These elements are illustrated, for example, in Figure 5 of the application. The specification makes clear that the “second microlens” and “second liquid crystal device” are separate components of the system, not light travel paths. This would have been clearly understood by one having ordinary skill in the art. Thus, it is irrelevant whether light in Ishihara returns through liquid crystal device 20 or microlens array 6. Rather, it is clear that Ishihara only discloses a first microlens and a first liquid crystal device. Thus, Applicants respectfully submit that Ishihara does not disclose all recited features of claim 3, and therefore cannot anticipate claim 3 under 35 U.S.C. §102.

Applicants' Response to Claim Rejections under 35 U.S.C. §103

Claims 7-18, 22 and 23 were rejected under 35 U.S.C. §103(a) as being unpatentable over Ishihara in view of Hoffman (U.S. Patent Application Publication No. 2001/0042837).

With regard to claims 7-18, it is the position of the Office Action that Ishihara discloses the invention as claimed, with the exception of amplitude modulation. The Office Action relies on Hoffman to provide this teaching. Specifically, the Office Action points to paragraphs [0021] and [0038] to provide this teaching.

In addition to the above comments, Applicants additionally note that Hoffman does not disclose or suggest features of present claims 7 and 12. In Hoffman, two light sources 3 and 5 are used. See Figure 1. The light source 3 provides point-like fluorescence excitation of the specimen. The light source 5 is superimposed onto the light source 3. See paragraph [0031]. The optical component 7 modifies the phase and amplitude of the light beam illumination 4. See paragraphs [0032] to [0035].

On the other hand, as required by present claims 7 and 12, the present invention uses only a single light source, and this amplitude modulated polarized light is modulated by a frequency f_1 or a plurality of different frequencies. Applicants respectfully submit that these points are not disclosed or suggested in either Ishihara or Hoffman.

Additionally, Applicants respectfully submit that that as with claim 3 above, Applicants submit that claim 12 is improperly rejected, since none of the references disclose or suggest a "second microlens" or a "second liquid crystal device." Favorable reconsideration is respectfully requested.

Amendment
Serial No. 10/529,395
Attorney Docket No. 052310

Claims 19-21 are rejected under 35 U.S.C. §103(a) as being unpatentable over Ishihara in view of Hoffman and in further view of Oshida (JP 2001-108684).

It is the position of the Office Action that the combination of Ishihara and Hoffman discloses the invention as claimed, with the exception of reference to a fluorescent marker or DNA material. The Office Action relies on Oshida to provide this teaching. In response, Applicants respectfully submit that these claims are patentable due to their dependency on the independent claims, as discussed above. Favorable reconsideration is respectfully requested.

Claims 24-26 are rejected under 35 U.S.C. §103(a) as being unpatentable over Ishihara in view of Oshida.

It is the position of the Office Action that Ishihara discloses the invention as claimed, with the exception of reference to a fluorescent marker or DNA material. The Office Action relies on Oshida to provide this teaching. In response, Applicants respectfully submit that these claims are patentable due to their dependency on the independent claims, as discussed above. Favorable reconsideration is respectfully requested.

For at least the foregoing reasons, the claimed invention distinguishes over the cited art and defines patentable subject matter. Favorable reconsideration is earnestly solicited.

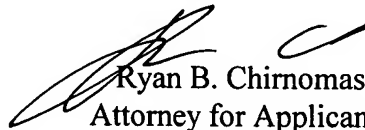
Should the Examiner deem that any further action by applicants would be desirable to place the application in condition for allowance, the Examiner is encouraged to telephone applicants' undersigned attorney.

Amendment
Serial No. 10/529,395
Attorney Docket No. 052310

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP

A handwritten signature in black ink, appearing to read "Ryan B. Chirnomas", is written over the printed name.

Ryan B. Chirnomas
Attorney for Applicants
Registration No. 56,527
Telephone: (202) 822-1100
Facsimile: (202) 822-1111

RBC/nrp